HIV Infection and Acquired Immunodeficiency Syndrome (AIDS)

- HIV positive status results from infection with the human immunodeficiency virus (HIV)
- Progression from HIV infection to AIDS
  - can range from months to years
  - increasing prevalence as people live longer
- Debilitating, eventually fatal
- CDC surveys incidence and prevalence

  Incidence: frequency of occurrence of an event or condition over a period of time, in relation to the population in which it occurs.

  Prevalence: # of cases of a dz present in a specified population at a given time.

Pathophysiology of Acquired Immunodeficiency Syndrome (AIDS)

Implications of Epidemiological Trends in AIDS

- Clients are living longer with disease

  "In fact, perhaps a more sober assessment would lead one to conclude that AIDS is a chronic, progressive disease that may be effectively managed in some patients but may still cause considerable morbidity and mortality in others."

  Peter A Selwyn, MD, MPH, and Mimi Rivard, ANP, MSN


Risk Factors for HIV infection

- Sexually active with an individual who is HIV positive
  - vaginal contraceptives containing nonoxynol 9 do not protect against infection (FDA Talk papers 1/16/03)
- Receipt of contaminated blood or blood products
  - Blood transfusions between 1978-1985
- STDs
- Needle exposure and needle sharing
- Occupational exposure

Risk factors for AIDS

- HIV infection
■ **Ineffective** highly active antiretroviral therapy (HAART)
  – Not tolerated
    • Side effects outweigh benefit
  – Not taken
    • Non adherence to therapy
  – Not prescribed effectively
    • Inappropriate therapy provided

11 ☐ Remember to distinguish between infection (HIV+) and disease (AIDS)

12 ☐ Diagnostic Testing for Infection
  ■ Counseling Testing, Referring (CTR)
    – Protect confidentiality
      • including option of anonymous testing
    – Obtain informed consent
    – Pre and post testing counseling
      • Referral to medical, prevention and support services
    – **Screen with enzyme-linked immunosorbent assay aka ELISA**
      • **Confirm diagnosis with follow-up testing, including repeat EI assay and Western blot.**
      • **Viral load** test measures HIV viral genetic material ➔ monitors dz progression

13 ☐ Prevention Counseling
  ■ Sexual transmission
    – Abstinence vs. safe sex
      • increased male to female
      • presumed to occur even with low viral loads
  ■ Parenteral transmission
    – Instructions to clean syringes Vs needle exchange
  ■ Perinatal transmission
    – Counseling for women of child bearing age

14 ☐ Diagnostic testing for degree of infection/workup before antiviral therapy
  ■ Normal CD4+ counts 800-1200 mm$^3$
    – Recall CD4+ counts with disease

  ■ Workup before starting therapy
    – CBC
    – LFTs
    – Electrolytes
    – Lipid Panel
    – U/A

15 ☐ Management of Occupational Exposure to HIV: Source status unknown or definite HIV +
  ■ Timing:
    – Post exposure counseling immediately
  ■ Testing:
    – Baseline workup similar to infection
PEP (Post-Exposure Prophylaxis):
- Initiated within 24-48 hours
- Antiretroviral therapy for 4 weeks

16 Collaborative Care for HIV Infection
Goal - Slow the progression from HIV to AIDS
- Antiretroviral therapy Charts 25-7
- Risk for infection
- Risk for infection transmission
- Risk for ineffective management of therapeutic regimen
- Risk for ineffective coping

17 Review of antiretroviral therapy
- Agents administered to reduce viral load
  - Goal of therapy is to suppress viral replication completely to stop the virus from mutating into drug-resistant forms
  - Emphasis is placed on drug adherence, timing of administration of medication to ensure maximal drug absorption, combination therapy and management of side effects to ensure continued use.
  - Evaluation of therapy focuses on identification of medication intolerance, nonadherence, and failure to achieve viral suppression as evidenced by increased viral load and decreased CD4 count.

18 Implications for Nursing Care
- Medication therapies are complex
- Must use best EBP (evidence based practice) protocols
- Must be able to interpret protocols to design client education to ensure adherence and minimize complication and adverse effect

19 ANTIRETROVIRAL DRUGS 2003
1 nucleoside RTIs*
- zidovudine (AZT, ZDV)
- didanosine (ddI)
- zalcitabine (ddC)
- stavudine (d4T)
- lamivudine (3TC)
- abacavir (ABC)
NNRTIs*
- nevirapine
- delavirdine
- efavirenz
Inhibit synthesis of RT-suppress viral replication, but do not kill virus!!
*structurally function as the same
2 nucleotide RTIs
- tenofovir (PMPA)
protease inhibitors
- saquinavir
- ritonavir
- indinavir
- nelfinavir
- amprenavir
- Lopinavir
Viral particles can not leave cells to infect others!!
3 entry inhibitors
- enfuvirtide (T-20)

20 Polypharmacology: Implications for Nursing Care
Understand classifications as a means to readily identify and/or prevent adverse events
Careful review of individual medication profile to identify regimen specific side effects
Develop a plan to enhance client tolerance and adherence
Identify adverse effects upon examination
Client/caregiver teaching instructions (verbal and written)
  – Signs and symptoms of adverse effects to report to health care team
  – Strategies to promote tolerance of medication therapy

21  □ Selected adverse effects of antiretroviral therapy

Source: Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents published July 2003 AETC NRC Slide Set

22  □ HAART-Associated Adverse Effects
  ■ Lactic acidosis/hepatic steatosis
  ■ Hepatotoxicity
  ■ Hyperglycemia
  ■ Fat maldistribution
  ■ Hyperlipidemia
  ■ Increased bleeding in hemophiliacs
  ■ Osteonecrosis, osteopenia, osteoporosis
  ■ Rash

23  □ HAART-Associated Adverse Effects: Lactic acidosis/hepatic steatosis
  ■ Possibly due to mitochondrial toxicity (in liver cells)
  ■ Associated w/ NRTIs
  ■ Clinical presentation variable
    – have high index of suspicion
  ■ Lactate >2-5 mmol/dL plus symptoms
  ■ Treatment:
    – d/c NRTI, supportive care

24  □ Client/family teaching: Lactic acidosis/hepatic steatosis
  ■ Report symptoms of:
    – Severe nausea, vomiting and abdominal pain that doesn't go away.
    – Shortness of breath and/or rapid breathing may also occur.
    – If you experience nausea, vomiting and abdominal pain it's very important to contact your healthcare provider immediately.
    – If you have lactic acidosis the NRTIs must be stopped to avoid further complications, which can be fatal.
Source: http://www.atdn.org/simple/lactic.html

25  □ HAART-Associated Adverse Effects: Hepatotoxicity
  ■ Severity variable:
    – usually asymptomatic, may resolve without treatment interruption
May occur with any NNRTI or PI:
  ■ Nevirapine:
- risk of severe hepatitis in first 12 wks of use (monitor LFT), increased risk in women, chronic hepatitis B/C
- PI:
  - especially RTV, RTV/SQV; increased risk in hepatitis B/C, ETOH, other hepatotoxins

26 Client/family teaching: Hepatotoxicity
- Instruct client to report symptoms of hepatotoxicity:
  - jaundice, rash
  - dark urine, clay colored stools
  - fatigue, malaise, irritability
  - abdominal pain, nausea, vomiting, fever
  - myalgia, arthralgia
- Avoidance of alcohol, OTC medications and herbal supplements unless approved by health care provider

27 HAART-Associated Adverse Effects: Hyperglycemia
- Hyperglycemia and diabetes associated with all PIs, especially with chronic use
- Mechanism not well understood
  - Insulin resistance, relative insulin deficiency
- Consider regular screening via fasting glucose

28 Client/family teaching: Hyperglycemia
- Instruct clients to report symptoms of hyperglycemia:
  - polyuria, polyphagia, polydypsia
  - headache, blurred vision, weakness
- perform capillary blood glucose testing as indicated

29 HAART-Associated Adverse Effects: Fat maldistribution
Lipodystrophy:
- No uniform definition
- Mechanism not understood
  - peripheral fat wasting more associated with NRTIs
  - central fat accumulation perhaps more associated with PIs
- May be associated with dyslipidemia, insulin resistance, lactic acidosis
- Treatment
  - insufficient data to guide

30 HAART-Associated Adverse Effects: Hyperlipidemia
- Elevations in total cholesterol, LDL, and triglycerides
  - Associated with all PIs (varies with agent)
  - Mechanism unknown
  - Consequences uncertain:
    - concern for cardiovascular events, pancreatitis
- Monitor regularly
- Treatment:
  - Consider substitution for PI; lipid-lowering agents (caution with PI + certain statins)
31 □ Client/Family Teaching: Hyperlipidemia
■ Evaluate routine screening for presence of hyperlipidemia
■ Careful review of lipid lowering agents to avoid drug-drug interaction
■ Instruct client to report s/s of anginal chest discomfort or pancreatitis
■ Encourage avoidance of alcohol
■ Nutritional consult

32 □ HAART-Associated Adverse Effects: Bone abnormalities
Osteonecrosis (AVN)
■ Mechanism unknown
■ Associated w/ PI’s
  – increased in: corticosteroid treatment, alcohol abuse, hemoglobinopathies, hyperlipidemia, hypercoagulable states
■ Dx: CT or MRI

33 □ HAART-Associated Adverse Effects: Bone abnormalities
Osteopenia and Osteoporosis
■ Mechanism: ill-defined; decreased osteoblast or increased osteoclast activity
■ Associated with PIs
■ Dx: DEXA in symptomatic pts (bone density)
■ Prophylaxis: No data. Consider calcium/Vit D, wt-bearing exercise, ? bisphosphonates for secondary prevention

34 □ Client/Family Teaching: Bone abnormalities
■ Assess for presence of pathological fracture/osteonecrosis
■ Teach client/family signs and symptoms of pathological fracture/osteonecrosis
■ Encourage caffeine/alcohol/cigarette smoking cessation
■ Eliminate home hazards that increase risk for falls
■ Encourage screening DEXA scan…can suggest osteoporosis, osteopenia before fx occurs
■ Consult MD regarding calcium supplementation as indicated

35 □ HAART-Associated Adverse Effects: Rash
■ Most common w/ NNRTIs, esp. nevirapine
  – Most cases mild-moderate, occur in first 1-6 weeks of therapy. Occ. serious (e.g. Stevens-Johnson Syndrome)
  – No benefit of prophylactic steroids or antihistamines (incr. risk with steroids)
■ NRTIs: esp. abacavir
  – consider hypersensitivity syndrome
■ PIs: esp. amprenavir

36 □ Client/Family Teaching: Rash
■ Instruct client to report s/s of Stevens-Johnson Syndrome:
  – Macular rash progressing to development of vesicles that rupture/slough and may develop necrosis
  – May be associated with fever, flu like symptoms

37 □ Adverse effects: HIV entry inhibitors
■ Fuzeon 90 mg SQ BID
Side effects:
- Injection site reaction (common);
- Hypersensitivity reactions (uncommon);
- Eosinophilia (↑ # eosinophils);
- Increased risk of pneumonia on phase III studies;
- Monitor for parasthesia, insomnia, depression, decreased appetite, weakness, muscle pain, constipation, pancreatic problems.

38 Nursing care of the client that progresses to AIDS

39 Clinical Manifestations of AIDS Chart 25-4
- Immunologic
  - fever, lymphadenopathy, fatigue
  - CD4 count < 200/mm³
- Integument
  - sores, impaired healing, night sweats
- Respiratory
  - cough, shortness of breath
- Gastrointestinal
  - diarrhea, weight loss and N/V
- Central Nervous System
  - confusion, dementia, pain, personality changes

40 Clinical classifications (subclasses according to CD4 count)
(Ignatavicius pg. 426)

Category A
- Asymptomatic, persistent lymphadenopathy, or acute HIV infection

Category B
- HIV infection with associated infections seen in deficiencies cell-mediated immunity such as TB, PID and peripheral neuropathy

Category C
- Considered to have AIDS when HIV is present with co-infection of certain stressors such as Karposi’s Sarcoma, Toxo, MAI, CMV

41 Laboratory Assessment-AIDS
- Lymphocyte counts
  1. Leukopenic: WBC ↓ 3500 cells/mm³
  2. Lymphopenic: ↓ 1500 lymphocytes/mm³
- CD4-CD8 counts
- Antibody tests
  1. Enzyme-linked immunosorbent assay (ELISA)
  2. Western blot
  3. Viral culture
  4. Viral load testing
- Disease specific testing

42 Opportunistic Infection - Tabers
- 1. Any infection that results from a defective immune system that cannot defend against pathogens normally found in the environment.
- 2. An infection that results when resident flora proliferate and infect a body site in which they are normally present or at some other location.
Opportunistic Infections

- Protozoal
  1. Pneumocystis carinii pneumonia (PCP)
  2. Toxoplasmosis encephalitis
  3. Cryptosporidiosis

- Fungal
  1. Cryptococcosis
  2. Histoplasmosis

Opportunistic Infections

- Bacterial
  1. Mycobacterium avium-intracellulare complex (MAC)
  2. Tuberculosis

- Viral
  1. Cytomegalovirus (CMV)
  2. Herpes simplex virus (HSV)
  3. Varicella-zoster virus (VZV)

AIDS-Related Malignancies

- Kaposi's sarcoma (KS)
- Hodgkin's lymphoma
- Non-Hodgkin's lymphoma (NHL)
- Invasive cervical cancer
- Seminoma
- Plasmocytoma
- Squamous carcinoma conjunctivitis

Nursing Diagnosis-AIDS…CAN YOU PLAN THE CARE?

- Risk for infection
- Impaired gas exchange
- Pain
- Altered nutrition, less than body requirements
- Diarrhea
- Impaired skin integrity
- Altered thought process
- Self-esteem disturbance
- Social isolation

An Integrated Model Approach:
Disease Modifying Therapy With Palliative Care

Disease Modifying Therapy
**Bimodal:**
- Antiretroviral therapy
  - Effective use of multiple agents to achieve viral suppression and improve quality of life
- Management of Opportunistic Infection
  - Early identification
  - Appropriate use of prophylaxis
  - Evaluation of treatment regimens

### Management of Opportunistic Infection

**Early identification**
- Assessment for presence of signs and symptoms of disorders
- Client education in signs and symptoms to seek consultation with their health care team

**Appropriate use of prophylaxis**
- Consultation with appropriate protocols and the health care team to continue versus terminate prophylaxis therapy

**Evaluation of treatment regimens**
- Assessment of client response and tolerance of regimens to manage opportunistic infections

### Infectious Clinical Syndromes Associated with HIV Disease

- **Respiratory**
- **Neurological**
- **Gastrointestinal**
- **Disseminated disease**
- **Genitourinary**
- **Integument**

### Collaborative Problems/Nursing Diagnoses associated with Infectious Clinical Syndromes

#### Respiratory
- Hypoxia versus ineffective respiratory function
- Pain
- Sepsis
- Activity intolerance versus fatigue
- Imbalanced nutrition: less than body requirements
- Risk for infection transmission (Pulmonary TB)

#### Neurological
- Seizures versus confusion
- Risk for injury
- Disturbed thought processes

#### Gastrointestinal
- Hypovolemia vs. deficient fluid volume
- Imbalanced nutrition
– Pain
– Impaired skin integrity
– Diarrhea
– Activity intolerance versus fatigue
– Risk for infection transmission (Hepatitis B, C)

**Disseminated disease**
– Sepsis
– Organic disorders dependent on involvement

53  
**Collaborative Problems/Nursing Diagnoses associated with Infectious Clinical Syndromes**

**Genitourinary**
– Acute pain
– Impaired skin integrity
– Risk for infection transmission (HPV)

**Integument**
– Acute pain
– Sepsis
– Impaired skin integrity
– Risk for infection transmission (Chicken pox)

54  
**Adverse effects of therapy to manage opportunistic infection**

**Bone marrow suppression**
– Cidofovir, dapsone, ganciclovir, pyrimethamine, rifabutin, sulfadiazine, trimethoprim-sulfamethoxazole, trimetrexate

**Diarrhea**
– Atovaquone, clindamycin

**Hepatotoxicity**
– Clarithromycin, fluconazole, isoniazid, itraconazole, ketoconazole, pyrazinamide, rifabutin, rifampin

55  
**Adverse effects of therapy to manage opportunistic infection**

**Nephrotoxicity**
– Amphotericin B, cidofovir, foscarnet, pentamidine

**Ocular effects**
– Cidofovir, ethambutol, rifabutin Pancreatitis

**Peripheral neuropathy**
– Isoniazid

**Skin rash**
– Atovaquone, dapsone, sulfadiazine, trimethoprim-sulfamethoxazole

56  
**Client/Family teaching to prevent syndromes associated with HIV/AIDS**

– Advise patients to always use safe sex measures
– Avoidance of sexual practices that may result in oral-fecal exposure
– Encourage injection drug users to seek counseling and substance-abuse treatment
– Advise patients on environmental or occupational exposures that increase risk of opportunistic infection
  – Hand washing after contact with potential sources of infection.
Client/Family teaching to prevent syndromes associated with HIV/AIDS

- Advise patients of potential risks associated with pet ownership
- Advise patients of food- and water-related exposures that increase the risk of opportunistic infection
- Emphasize precautions for patients traveling to developing countries.
- Recommended that HIV-infected persons should be immunized with inactivated (killed)-virus vaccines only

Keys in Chapter 25 and [p.28/Powerpoint Handout]

- Healthy People 2010 Objectives
- Concept Map : HIV Infection
- Key Features of AIDS
- CDC Classification
- Best Practice for Prevention of Infection in an Immunocompromised Client
- Client Education Guide: Prevention of Infection
- Focused Assessment of the Home Care Client with AIDS

Page 386

- The 28yo pregnant client with CDC category B2 HIV disease is at home on a drug regimen that includes ziduvodine therapy. During a home visit, she tells the visiting nurse that she is short of breath and has pains in her chest.
- What Assessment should you perform?
- What questions regarding this new problem should you ask?

On further assessment, you find her oral T-102.2F and there are crackles at the bases of her lungs bilaterally.
- What should you do first?